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CONTINGENT VALUATION METHOD IN TERMS OF BEHAVIORAL ECONOMICS

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METODA WYCENY WARUNKOWEJ W UJĘCIU EKONOMII BEHAWIORALNEJ

STRESZCZENIE: Celem artykułu jest próba wskazania przyczyn rozbieżności między rzeczywistą a deklarowaną skłonnością do akceptacji / zapłaty opartych na dokonaniach ekonomii behawioralnej. Rozważania zmierzają do uargumentowania tezy, zgodnie z którą ekonomia behawioralna może być przydatna w wyjaśnianiu rozbieżności między deklarowaną a rzeczywistą WTA/WTP w metodzie wyceny warunkowej. W artykule wskazano, iż błędy poznawcze i zasady myślenia heurystycznego wpływają na pozycję funkcji WTA/WTP, co powoduje przeszacowania lub niedoszacowania w wycenie dóbr pozarynkowych.

SŁOWA KLUCZOWE: metoda wyceny warunkowej, błędy poznawcze, ekonomia behawioralna, efekt zakotwiczenia, awersja do straty, księgowanie umysłowe, status quo

Introduction

One of the essential research issues that are developed within the frameworks of environmental economics and natural resources is the valuation of environment amenities and resources having the character of non-market goods. This task is complex, in contrast to the goods which are the subject of market exchange, in the way that it implies the necessity to consider the entire range of values, i.e. both direct and indirect use value as well as non-use values that in entirety make up the total economic value of the good. One of the ways to solve this problem is to use the methods of stated preferences which imply the attempt to simulate the market into non-market goods. Such simulation is usually made by means of a survey research in the form of interviews conducted with consumers that quote their own hypothetical prices of non-market goods. The research conducted in this way is known as *Contingent Valuation Method (*CVM).

The result of CVM research is determination, among respondents, of what is the average readiness to pay for specific improvement or maintenance of environment resource/amenity. The basis of valuation is the creation of a hypothetical situation in the form of a scenario of events in which the state of non-market good is subject to modification[1]. The research can be realized using two techniques: ''by asking the users of a certain non-market good how much they would be willing to pay (WTP) for having the good supplied to them or what compensation they would be willing to accept if they lost the good they possess presently"[2].

The CVM method uses the following formats of questions: open-ended, closed-ended and multiple choice. The first format regards the valuation of the upper limit in the willingness to pay (the lower limit of the willingness to accept). Therefore, they facilitate valuation of the specific good, but are largely hypothetical because as it comes to real market decisions, the consumers do not have the opportunity to suggest prices in an unrestrained way. On the other hand, survey questions (in a closed-ended format) enable determination of whether WTP/WTA is either above or below the indicated level. However, they do not generate data in a numerical form that would constitute the basis of valuation. The most frequently asked questions, i.e. in the multiple-choice format, make it possible to indicate the exact amount in the declara-

1 M. Czajkowski, *Metody wyboru warunkowego i wyceny warunkowej,* in: *Wartości nierynkowych korzyści z lasów. Metody wyceny oraz zastosowanie wyników w analizach ekonomicznych*, www.polforex.wne.uw.edu.pl [23-02-2015], p. 29.

2 T. Żylicz, *Ekonomia środowiska i zasobów naturalnych,* Warszawa 2004, p. 41.

tions of respondents and simultaneously make the situation similar to that on the market[3].

As regards the environmental goods, the contingent valuation method was used for the first time in 1960 by Robert K. Davis[4]. Initially it aroused controversy among economists, but in the 1990s it gained popularity. Following the Exxon Valdez oil spill Valdez[5] in 1989, the National Oceanic and Atmospheric Administration (NOAA) convened the *Contingent Valuation Panel (CVP)* chaired by Kenneth Arrow and Robert Solow in order to confirm the validity of valuating the losses to the environment that had been caused by the catastrophe[6].

The Panel prepared the Report which implied that the CVM can be used as the credible manner of valuation as long as certain methodological recommendations are complied with[7]. Compliance with these recommendations aims at minimizing the discrepancies between the real and declared willingness to pay for a specific good. Moreover, the essence of the recommendations lies in the attempt to predict the circumstances that have impact on these discrepancies. Although the report has been in use for more than 20 years, the recommendations included there still remain relevant. However, in the last decade there appeared economic studies the results of which suggest the existence of other circumstances (not predicted by the report authors) that may to a large degree deform the relations between the real and declared willingness to pay/compensate. In this aspect, the research conducted within the framework of the so called behavioral economics appears to be particularly interesting.

The paper aims at indicating the reasons of discrepancies between the real and declared WTA/WTP on the basis of the results of behavioral economics.

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3 M.W. Hanemann, J. Loomis, B. Kanninen, *Statistical efficiency of double bounded dichotomous choice contingent valuation,* "American Journal of Agricultural Economics" 1991 no. 73(4), p. 1255-1263.

4 Further: R.K. Davis, *The value of outdoor recreation: an economic study of the main woods*, Harvard 1963.

5 On 24 March 1989 at the coast of Alaska there occurred the spill of 11 million US gallons of crude oil, which caused contamination of 1900 km of the shoreline and death of numerous animals, Further: J.R. Payne, W.B. Driskell, J.W. Short, M.L. Larsen, *Long term monitoring for oil in the Exxon Valdez spill region*, "Marine Pollution Bulletin" 2008 vol. 56, issue 12, p. 2067–2081.

6 K. Arrow, R. Solow, P.R. Portney, E.E. Leamer, R. Radner, H. Schuman, *Report of the NOAA Panel on Contingent Valuation,* January 11, 1993, p. 5-6.

7 Ibidem, p. 17.

Assumptions of behavioral economics

Behavioral economics differs from mainstream economics in the way that it takes into consideration psychological and social variables of market decisions. Presently it is perceived as "the way of analyzing economic behaviors using knowledge from the domain of psychology and economics and taking into consideration social and emotional factors" [8]. Behavioral economics is treated as an interdisciplinary approach to the analysis of management processes, mainly those perceived through the prism of decision-making processes while taking into consideration knowledge from the domain of economics, psychology, sociology and cognitive sciences.

The achievements in the sphere of behavioral economics are visible chiefly in the form of papers and research reports in scientific magazines. They are characterized as selective to a certain degree and as not having satisfactory generalizations that would make this science the domain of knowledge. Andrzej Wojtyna shows that behavioral economics "does not constitute homogenous trend, but a series of interrelated motives"[9].

The development of behavioral economics is related to both decision theory and game theory. The first research and development centre conducting such studies was the University of Michigan – defined in literature as the American school of interdisciplinary decision theories. The research in this domain has been initiated by Clyde Hamilton Coombs, the creator of the theory of data. The first representatives of the theory included also Howard Raiffa from the Harvard Business School in Boston. An important role in the development of the field is attached to the research conducted by Daniel Kahneman, Amos Tversky and Paul Slovic from the *Decision Research* in Eugene, Oregon[10]. The early development of behavioral study in economics is also ascribed to the research conducted by Hubert A. Simon who demonstrated considerable dissimilarity of real conduct of market entities from the model adopted in neoclassical economics[11].

The basic assumptions of behavioral economics concentrate on the criticism of the premise regarding full rationality of market entities. The concept of *Homo Economicus* (HO) implies that market entities are rational, which means that they make decisions on the basis of complete and ideal informa-

8 B. Gorlewski, *Podejście behawioralne w naukach ekonomicznych. Przykład ekonomiki transportu*, in: R. Bartkowiak, J. Ostaszewski (ed.), *Nauki ekonomiczne w świetle nowych wyzwań gospodarczych*, Warszawa 2010, p. 376.

9 A. Wojtyna, *Współczesna ekonomia – kontynuacja czy poszukiwanie nowego paradygmatu*, „Ekonomista" 2008 no. 1, p. 20.

10 A. Biela, *Informacja i decyzja w ekonomii behawioralnej,* Lublin 2011, p. 15.

11 H.A. Simon, *A Behavioral Model of Rational Choice*, "The Quarterly Journal of Economics" 1995 no. 1, p. 99.

tion, are capable of processing it in entirety and in their decisions they always strive for maximizing profit or usefulness. HO does not take into consideration the usefulness of other entities and does not act in a purely altruistic manner[12] or emotionally, but considers and makes the best decision while being on the highest (possible – due to budget limits) curve of usefulness[13].

Behavioral economics is based on indicating cognitive biases as the consequence of heuristic processing. Its essence lies in ignoring some data and making assessments or making decisions on the basis of random information that can be characterized as highly adaptational[14].

One of the most crucial research in behavioral economics is the one concerning the consumers' decisions. Scientists representing this mainstream make use of interdisciplinary knowledge (primarily from the domain of psychology) to describe in a more extensive and detailed way the process of making market decisions as well as the human perception of economic value. This area appears to be particularly interesting from the perspective of the analysis shown in the paper. It is due to the fact that the contingent valuation is based on the attempt to simulate market decisions with reference to goods that are not subject of market exchange, and afterwards on the attempt to quantify these decisions, which aims at determining the value of such goods. Good knowledge of the principles controlling the decision-making process enables better control of both the environment and institutions[15] during CVM, and consequently it reduces the risk of large discrepancy between the declared and real WTA/WTP.

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12 Although it has not been stated that from other reasons maximizing usefulness (e.g. good name, prestige) one may not undertake seemingly altruistic actions).

13 S. Dudziak, *Ekonomia behawioralna – interdyscyplinarne podejście do zachowań ekonomicznych*, „Studia i Prace Wydziału Nauk Ekonomicznych i Zarządzania" 2013 no. 32, p. 24-25.

14 A. Falkowski, T. Zaleśkiewicz, *Teoria i praktyka psychologii poznawczej,* in: A. Falkowski, T. Zaleśkiewicz (eds.), *Psychologia poznawcza w praktyce. Ekonomia, biznes, polityka*, Warszawa 2012, p. 18.

15 According to the authors the CVM ought to be treated as certain economic experiment. Owing to this the terms "environment" and "institutions" need to be perceived in the context of economic experiments (see: V.L. Smith, *Economics in the Laboratory*, "Journal of Economic Perspective" 1994 no. 8(1), p. 113-131). The environment simply means social and economic surrounding, whereas institutions define the language of statements ensuing from the unnatural situation that imitates the market. In other words, institutions stand for a set of principles determining the way of forming the offer, accepting it and signing the agreement, etc.

The assumptions of the analysis

The dissonance between the declared and real WTA/WTP may result from many reasons, which may not be dependent on one another. According to the authors these reasons can be divided into two groups:

- actual discrepancy between declarations and real preferences,
- temporary modification of WTA/WTP.

Real discrepancy occurs when respondents either intentionally or unintentionally declare different WTA/WTP than their real preferences are. Conscious overrating or underrating of the declared value in relation to the preferences may trigger such effects as: free rider problem, yea-saying, protest bidders, embedding, scope effect and the effect of a good respondent. In most cases these effects are well described in the professional literature and consequently they are taken into consideration in the stage of planning the research. The reasons belonging to the second group appear to be much more interesting and have not been studied extensively.

The second group of reasons comprises situations in which respondents declare the WTA/WTP value in accordance with their real preferences. In this case the problem does not lie in either intentional or unintentional discrepancy. What matters is the fact that in the study their WTA/WTP is subject to temporary modification as the consequence of heuristics and cognitive biases. It means that the willingness to pay or accept compensation during the research differs from that the respondents would declare in the real situation. Consequently, there comes to modification of the curve showing the willingness to pay/accept.

The curve showing the willingness to pay/accept presents the dependence between the willingness to pay (WTP) or the willingness to accept (WTA) and cumulative number (figure 1). The area between the number N of population on the axis x and the average level of WTA/WTP on the axis y indicates the value of environmental good[16]. Adoption by the function of declared preferences the shape of a straight line is considerable simplification. Most likely it adopts the shape of a hyperbole where the point of osculation on the axis x marks out the numerical force of sample (population), whereas the point of with axis y stands for the highest sum declared by the respondents. In both cases the N point remains stable, whereas the point of osculation with axis y is modified depending on the highest declaration. In the simplified version temporary changes in the respondents' willingness to pay/accept cause change in the angle of inclination of the curve in relation to

[16] For simplicity it was assumed that the entire population has been analyzed in the CVM research.

axis x. In the situation when it adopts the shape of a hyperbole the reflection would be change in the concavity of the function.

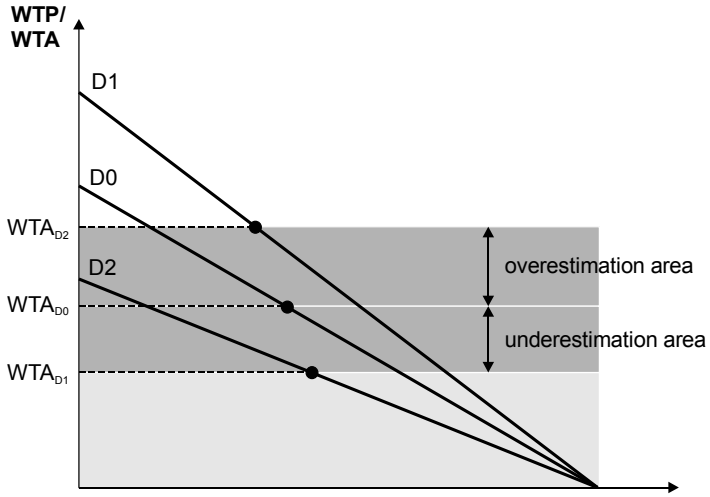

Figure 1. Model of function of declared willingness to pay (accept) in the CVM

In the diagram shown above, the curve D_0 stands for the actual curve of preferences of the respondents. Some factors which increase the willingness to pay for environmental goods may cause its temporary modification to D_1 level, and thus mark out the average WTA/WTP on the WTA/WTP_{D1} level. This, in turn, results in overestimation of the valuation comprising the ABCD area. By contrast, the occurrence of factors modifying the curve to D_2 level (i.e. lowering temporarily the willingness to pay for the realization of a certain scenario) causes underestimation of the value of the good valuation, comprising the ABEF area.

The analysis concentrates on seeking behavioral impacts that cause temporary changes in the angle of the curve showing the declared willingness to pay. This, in turn, causes shaping of the average scale of preferences on a different level ($WTA/WTP_{D0} \rightarrow WTA/WTP_{D1}$ where $\Delta WTA/WTP$ adopts positive values or $WTA/WTP_{D0} \rightarrow WTA/WTP_{D2}$ where $\Delta WTA/WTP$ adopts negative values). Among the observed areas of impacts the following can be listed: anchoring effect, loss aversion, errors in probability distortion in decision under risk, ownership effect, mental accounting, availability heuristic, priming effect, status quo, warm glow effect, confirmation effect, scope effect, processing fluctuation, reactions to great numbers and cultural nuances and aversions to payment mechanisms.

Reasons of temporary modification of WTA/WTP

The most frequently discussed aspect of contingent valuation in the literature is the anchoring effect. It implies that individuals estimate value on the basis of the suggested basic level which constitutes the so called anchor[17] or reference point. This, in turn, leads to the situation where the sum offered to be paid or accepted has impact on the respondents' declarations, thus modifying the position of the curve D.

Closed-ended questions which are used in the CVM are always susceptible to the operation of the anchoring effect. This problem has been noticed in literature. Tomasz Żylicz states that "from the beginning they have been tainted by arbitrariness of the sums quoted by the poll taker: people are easily influenced by certain quoted sum and have the tendency to treat it as something appropriate or typical"[18]. This issue has been raised also in the NOAA report. On the other hand, the application of closed-ended questions in the CVM is justified because it makes the situation similar to that on the market. Most market decisions are of closed-ended type and are based on the acceptance of a certain price or on rejection of it. Determination of the reference point above the WTA/WTD_0 point causes certain area of overestimation of the valuation, whereas when it is below this point – underestimation.

In this place the authors form a scientific hypothesis that requires empirical verification: What is the percentage aberration of the average declared WTA/WTP when the used price of the anchor is either above or below the average value of WTA/WTP valuated in accordance with the methodological recommendations for the realization of this research method?[19].

According to the NOAA report, the elimination of the anchoring effect lies in working out a certain reference point by experts and on the basis of trial research[20] using open-ended questions. The objective is to determine intervals with which the lowest value is accepted by almost 100% of the group, while the highest value is rejected by almost everyone[21]. For this purpose the so called rate card can be used[22].

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17 T. Tyszka, *Psychologiczne pułapki oceniania i podejmowania decyzji*, Gdańsk 1999.

18 T. Żylicz, op. cit., p. 93.

19 In other words, how strong effect results in the setting of the base WTA/WTP AT the level that is 30% higher/lower than the sum set in accordance with the premises of methodology and with what aberrance the effect is not visible?

20 K. Arrow, R. Solow, P.R. Portney, E.E. Leamer, R. Radner, H. Schuman, op. cit., p. 39.

21 T. Żylicz, op. cit., p. 94.

22 R.D. Rowe, E.D. Schulze, W.S. Breffle, *A test for payment card biases,* "Journal of Environmental Economics and Management" 1996 no. 31(2), p. 178-185.

Despite all these recommendations the complete elimination of the anchoring effect in the contingent valuation method remains unexplained. This is related to the focusing effect which implies making evaluations on the basis of clear premises or concrete details, while others are underestimated. This decides, among others, upon the tendency to avoid extreme options in the declarations regarding choices. As Tadeusz Tyszka wrote: "attractiveness of an alternative increases when it occupies the position in the middle and it decreases when it is an extreme alternative"[23]. The populations that are analyzed using CVM are composed mostly of people having various preferences. If the extreme values established for the experiment is 0,10 PLN and 100 PLN, whereas the average WTA is 40 PLN, the determination of the basic proposal on this average level (although it will be the sum selected in accordance with methodological recommendations) is going to modify the preferences of those respondents who in fact declare their willingness to pay extreme sums, which ultimately will modify the angle of inclination from curve Do.

What also has influence on the divergences between the declared and real willingness to pay is loss aversion. Empirical verification shows that generally people mostly suffer because of losses rather than they are satisfied with profits. Incurring losses is much more intense than achieving either potential or real profits. Owing to this, in turn, as regards losses individuals show smaller tendency to risk than it is with profits[24]. In CVM the answers can be dependent on whether the question is formulated as the payment (acceptance) for not losing something and keeping the good just as it is (for example, the research regarding the willingness to keep the present class of water in a lake) or for improving the state of a certain environmental good. Since individuals suffer more because of losses, it is more likely to receive higher results in valuations in the first variant.

This issue has been the subject of the research conducted by Timothy L. McDaniels which concerned the problem of valuating the state of safety. In the survey respondents were asked about their willingness to pay 700$ more for their new car so that its safety increased by 20% (which was related to installing inflatable cushions). The willingness to pay more was expressed by 46% of the respondents. The second group was asked about their acceptance to pay less exactly the same amount of money which would be related to lowering the state of safety by 20%. In this case only 17% of the respondents expressed their consent, which means that 83% of them were likely to pay this sum in order to keep a certain state of safety unchanged[25]. This, in turn,

23 T. Tyszka, *Pułapki oceniania*, „Decyzje" 2010 no. 13, p. 13-14.

24 P.R. Blavatsky, *Loss aversion,* "Economic theory" 2011 no. 26, p. 127-128.

25 T.L. McDaniels, *Reference Points, Loss Aversion and Contingent Values for Auto Safety,* "Journal of Risk and Uncertainty" 1992 vol. 5 issue 2, p. 187-200.

shows that the respondents appreciate more the loss they sense as regards the car safety than they value the gain in the form of improved safety.

In the analyzed area there can be observed a problem regarding the selection between analyzing the declared willingness to pay for keeping/improving the good (WTP) and analyzing the accepted sum of compensation for the loss/worsening the state of the good (WTA)[26]. The loss aversion results in the fact that declarations in WTA technique are higher than in WTP technique. The research in the analyzed sphere was conducted by John K. Horovitz and Kenneth E. McConnell. By analyzing various valuations using WTA/WTP methods, they have shown that the pain caused by resignation from an element that is part of someone's equipment was more severe than the satisfaction with taking over the same element. Interestingly, the study has also shown that the differences are considerably smaller than in the case of repeated transactions, for example in the system of auctions. However, it cannot be applied in the CVM valuation, which makes it particularly susceptible to the error in the form of loss aversion[27]. This issue has been analyzed also by Andrea Isoni who has drawn the conclusion that there is large disproportion between the valuation using WTA/WTP method, which is most likely related to loss aversion[28].

Loss aversion is also related to the willingness to take risk depending on the way of presenting data. It is connected with the so called perverse effect. In accordance with it individuals perceive the prognosis of profits in a different way than the prognosis of losses. As Tyszka writes: "Many [...] studies confirm that people are generally more eager to undertake an activity when they are shown what are the negative consequences of abandoning this activity than when they see the positive consequences of taking it"[29]. It means that the willingness to renounce activities increases when people are shown the positive consequences of activity (e.g. payments). On the other hand, when people see the negative consequences, their willingness to abandon the activity is getting smaller. Thus, the curve of declared preferences is shifting from position D_0 towards D1 in the situation where the scenario of events in CVM presents negatively the consequences of abandonment. Simultaneously, if it is based on the positive consequences of taking activity the curve is shifting towards D_2. This, in turn, implies the necessity to be extremely careful in the

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26 T. Żylicz, op. cit., p. 41.

27 J.K. Horowitz, K.E. McConnell, *A review of WTA/WTP studies,* "Journal of Environmental Economics and Management" 2002 no. 44(3), p. 426-447.

28 A. Isoni, *The willingness-to-accept/ willingness-to-pay disparity in repeated markets: loss aversion or 'bad-deal' aversion?,* "Theory and Decision" 2011 vol. 71 issue 3, p. 409-430.

29 T. Tyszka, *Pułapki ...*, p. 22.

stage of forming the scenario of events. The solution may be indication of both positive and negative consequences of a certain activity or lack of it.

The aforementioned changes in the declared preferences in the CVM are related also to the attachment effect. In accordance with it individuals attach higher value to the things they already possess than to those they could potentially be owners of[30]. It can be expected that if in the CVM method a question is formed regarding the willingness to pay for keeping the already possessed good, the willingness to pay will be greater than in case of presenting a scenario presenting the improvement of certain conditions[31].

The attachment effect is also related to the emotional attitude to money described on the level of behavioral finance. Research shows that individuals do not appreciate money that they are not the owners of. They appreciate more the value of money that they already possess. It results from the assumption that "people segregate various types of investments and they consider each of them separately in the function of potential profits/gains and losses"[32] and simultaneously differently assess streams of incomes depending on their origin and the time of making transactions[33]. Richard Thaler isolates in this sphere three mental book-keeping accounts: account of the current incomes, possession account, and account of future incomes. The first account is supported by the current incomes and covers the current consumption expenses. On the one hand, individuals display larger willingness to cover their expenses from this account, while they evaluate this group of funds as better owing to the affection effect. This, in turn, makes one think over the creation of appropriate mechanism of payments in valuations. If the suggested hypothetical form of payment is connected with the necessity to make payment immediately, it is most likely to result in the shifting of the curve of preferences towards D_2. In turn, if the mechanism of payment is related to the future, not defined in detail, streams of incomes, respondents will be encouraged to form higher declarations.

Temporary shift of curve D in the contingent valuation can be caused also by availability heuristic. According to it individuals make estimates regarding the probability or frequency of certain events on the basis of the possibility to evoke them in memory in the form of experiences or associations. The simplicity of recalling certain events does not need to be related to the fre-

30 S. Dudziak, op. cit., p. 31.

31 J. L. Knetsch, J. A. Sinden *Willingness to pay and compensation demanded – Experimental evidence of an unexpected disparity in measures of value*, "Quarterly Journal of Economics" 1984 no. 99(3), p. 507-521.

32 P. Zielonka, *Finanse behawioralne,* w: T. Tyszka (ed.), *Psychologia ekonomiczna,* Sopot 2004, p. 351.

33 D. Maison, *Polak w świecie finansów. O psychologicznych uwarunkowaniach zachowań ekonomicznych Polaków,* Warszawa 2013, p. 47.

quency of their occurrence[34]. This effect temporarily modifies the position of curve D. In NOAA report it is explained using the example of probable occurrence of the effects of chemical spill. Those respondents that are convinced of high probability of the occurrence of spill will display relatively considerable readiness to pay for protective installations ($D_o \rightarrow D_1$). Respondents evaluating the risk as low are going to display smaller willingness to pay ($D_o \rightarrow D_2$). In this place the report authors draw attention to the necessity to present the situation while taking into account certain probability of occurrence. If respondents assume that the consequences are less probable they will value it as lower[35].

From behavioral perspective, if in a certain period of time there took place an event that was widely covered in mass media (e.g. protest of ecologists against the construction of wind power stations in naturally precious areas), the willingness to pay for avoiding the construction in a certain area will temporarily increase[36]. Respondents will be able to easily recall what would be the negative consequences of making the decisions regarding the location of a certain investment. Probably the willingness to pay can be influence by educational activity or nature-related film emitted on television before the research.

It is probable that the same effect can be observed depending on the year season. Respondents valuating the environmental good in the season when they do not use it or they use it to a smaller degree (e.g. maintenance of park, forest, water of the Baltic sea) will have lower declarations $D_0 \rightarrow D_2$). Similarly, in the summer one can expect higher declarations as regards the willingness to pay for maintaining such common goods as beaches or water in lakes. These deliberations however, have only hypothetical character and require empirical verification.

Availability heuristic is related to the issue regarding priming effect. It means such cognitive situation in which the occurrence of a certain stimulus – frequently accidental one – modifies the correctness of processing further stimuli. It causes giving priority in defining the context and trying to recall those elements that were given priority to, most frequently these were the signals sent to an individual directly prior to the operation of the stimulus that causes the reaction. The priming factor activates a certain way of forming associations which causes that reaction to another stimulus is not self-

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34 M. Czerwonka, M. Reszutek, *Analiza zachowań inwestycyjnych inwestorów giełdowych oraz studentów kierunków ekonomicznych i psychologicznych z pespektywy finansów behawioralnych*, „Studia i Prace Kolegium Zarządzania i Finansów" 2011 b. 107, p. 34.

35 K. Arrow, R. Solow, P.R. Portney, E.E. Leamer, R. Radner, H. Schuman, op. cit., p. 30-32.

36 See: J. Marcinkiewicz, T. Poskrobko, *Wpływ elektrowni wiatrowych na percepcję krajobraz w świetle badań empirycznych*, „Ekonomia i Środowisko" 2015 no. 2(53).

contained, but is connected with the priming stimulus that leaves certain trace which changes the processing of the subsequent stimulus[37].

This, in turn, means that if respondents in CVM method are either consciously or not subject to priming before starting the research there will take place incidental and short deviation of the curve D ($D_0 \rightarrow D_1 / D_0 \rightarrow D_2$). The problem of priming was raised directly in the NOAA report. It points at the necessity of proper selection of information so as not to influence the respondents' declarations using the principle of priming[38].

In accordance with the status quo effect individuals strive for the maintenance of the status quo and are reluctant to undertake activity in order to change it. The present state of an environmental good determines the willingness to pay for its improvement or maintenance. If a scientist informs about the need to undertake an activity in order to maintain a certain status quo, the willingness to pay will be probably higher than in the situation where someone asks about the willingness to pay for improvement of the state of the environment. In general, there can be observed greater willingness as regards not allowing for changes than improving the situation. This problem was raised by Żylicz. He claims: ''If the establishment of rigorous regulations was necessarily connected with satisfying the conviction of social fairness, the lack of permit for financing would mean simply acceptance of status quo, i.e. unsatisfactory protection of the environment"[39].

The aspect of proper preparation of a questionnaire of events can be related to the so called processing fluency. At the end of the last century psychologists have proved in their research that either simplicity or difficulty with processing information may have crucial impact on assessments and behaviors[40]. Indication of this effect is the well known fact in psychology according to which people attach higher value to things they are well familiar with. For example, in shops well known brand names or products are selected more frequently than the less known ones because the former are assessed as better, more effective, etc. Similar phenomenon can be observed in the context of investments. Adam L. Alter and Daniel M. Oppenheimer have observed on New York Stock Exchange that in the first weeks following the introduction of company shares on the stock exchange, the companies having symbols that are simple to pronounce achieved higher profits than it was with the shares of companies having more difficult symbols.

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37 T. Maruszewski, *Psychologia poznawcza,* Gdańsk 2001, p. 168-170.

38 K. Arrow, R. Solow, P.R. Portney, E.E. Leamer, R. Radner, H. Schuman, op. cit., p. 10.

39 T. Żylicz, op. cit., p. 85.

40 R. Reber, P. Winkielman, N. Schwarz, *Effects of perceptual fluency on affective judgments*, "Psychological Science" 1998 no. 9, p. 45-48.

In relation to the CVM research, processing fluency may have influence on the temporary change of curve WTA/WTP. In particular, this phenomenon may be related to the dependence between processing fluency and risk evaluation, disturbance of expectations regarding the future and sympathy for the valuated environment good or amenity.

The impact of processing fluency on the evaluation of risk has been discovered by Hyunjin Song and Norbert Schwarz[41]. The participants of the research conducted by them evaluated non-existing food additives whose specific names were invented by the researchers. It turned out that the additives the names of which were difficult to pronounce were evaluated as more harmful than the additives with simpler specific names. In the domain of CVM, the presentation of a scenario or the way of formulating a question can form problem with the processing effect. For example, the question regarding the importance of the program serving the protection of *Tilio-Carpinetum* community from vermin *Ips typographus*, may yield considerably different answers than the question regarding the protection of hornbeam forests from woodworm printer although this question in fact regards the same issue.

The impact of processing fluency on the expectations regarding the future is visible in the research where it has been proved that people feel less prone to illness, if they find it difficult to imagine either symptoms or factors of risk[42]. Similarly to the previous example, inappropriate formulation of a question or a scenario may modify the WTA/WTP curve. For example, the questions regarding the willingness to pay for reducing by 90% the risk of release of R-11 freon from a refrigerator could yield different results than the question regarding the willingness to pay for reducing by 90% the risk of release of trichlorofluoromethane from a refrigerator.

The dependence between the processing fluency and the affection for a certain object lies in the fact that people feel more attached to those objects they can either imagine or recall. It means that in CVM research there can occur the problem of temporary modification of WTA/WTP curve, depending on the way the good will be valued. For example, the answer to the question regarding the valuation of the existence of a sperm whale may depend on how the form of a question will influence the fluency of processing information (and thus the sympathy for sperm whales). It may be assumed that the presentation of a photo showing this mammal is likely to give a considerably different effect than usage of its Polish name or even Latin name.

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41 H. Song, N. Schwarz, *If it's difficult to pronounce, it must be risky: Fluency, familiarity, and risk perception*, "Psychological Science" 2009 no. 20(2), p. 135-138.

42 A.J. Rothman, N. Schwarz, *Constructing perceptions of vulnerability: Personal relevance and the use of experiential information in health judgments,* "Personality and Social Psychology Bulletin" 1998 nr 24, p. 1053-1064.

However, the authors emphasize that according to their knowledge so far there has not been any research regarding the impact of processing fluency on the dimension of declared preferences, and thus the dependencies shown above ought to be treated as a research hypothesis.

Additionally, there appears to exist a relation between the way of expressing in a numerical way the sum to pay/accept and the answers given by respondents. As far as this relation is concerned, respondents react with considerably larger willingness to pay when they are offered small numbers (for example 1% of their income) than larger sums (1 000 PLN for each 100 000 PLN they earn). However, this problem has been observed already in the stage of conducting research using CVM[43], but it still has been verified in the results of empirical research and for this reason it needs to be treated as research hypothesis.

The essential element of realizing the CVM has been indicated by Mark D. Morrison, Russell K. Blamey and Jeff W. Bennett. The authors show that the method has been sanctioned in the USA and the most important recommendations regarding its realization (including the analyzed NOAA report) have been formed there. They claim that it results in not taking into consideration both cultural and institutional factors that determine the willingness to pay/accept. A typical payment mechanism that is used in the WTP scenario are taxes. This, in turn, contributes to the fact that in a country with considerable social difficulties with tax systems (in which difficulties are already on a high level) the declared willingness to pay another tax is going to be considerably lower than the real valuation of the environmental good. It is due to the fact that the dependence will be disrupted by the general negative attitude towards a certain form of payment. This problem has been observed also during the expert NOAA panel. It has been indicated that low declarations regarding payments can be connected with general aversion to taxes or with the conviction that another individual ought to be burdened by certain costs. Therefore, the report's recommendation is that CVM instrument ought to include questions that aim at finding the presence of these prejudices[44].
Secondly, several countries do not have experience in preparing referendum. Owing to this it is difficult to authenticate such form of conducting research. It is due to the fact that respondents in advance perceive a certain situation as purely hypothetical which, in accordance with research results, most frequently increases their willingness to pay ($D_0 \rightarrow D_1$)[45]. This problem has been

43 See: M. Ligus, T. Poskrobko, E. Sidorczuk-Pietraszko, *Pozaśrodowiskowe efekty zewnętrzne w lokalnych systemach energetycznych*, Białystok 2015.

44 K. Arrow, R. Solow, P.R. Portney, E.E. Leamer, R. Radner, H. Schuman, op. cit., p. 22.

45 M.D. Morrison, R.K. Blamey, J.W. Bennett, *Minimising Payment Vehicle Bias in Contingent Valuation Studies,* "Environmental and Resource Economics" 2000 no. 16, p. 407-422.

indicated also in NOAA report. It has been defined that if a respondent has doubts regarding the practicability of the suggested scenario (e.g. organizational ability to take actions), their motivation to make truthful declarations will be lowered[46].

In both aforementioned cases the solution could be application of controlling questions regarding the level of acceptance for the payment mechanism and checking the level of authenticating the conducted research. This implies the necessity to analyze the suggested payment mechanism and think over its acceptance due to cultural and institutional conditionings[47].

Conclusion

The analysis presented in the paper enables drawing the following conclusion: the achievements of behavioral economics can be useful at the stage of planning research using the CVM. They facilitate better understanding of what are the reasons of divergences between respondents; declarations and their actual willingness to pay (or accept) for a certain good. Heuristic thinking inspires researchers to either overestimate or underestimate the formed declarations. The research results are dependent on appropriately chosen reference point. Loss aversion, especially as regards profits, results in the overestimation of the research conducted using WTA technique in relation to WTP. The suggested payment mechanism activates heuristic of mental accounting and protesting attitude and discloses cultural nuances. By contrast, the form of creating the scenario of events activates the effect of processing fluency and availability heuristic. The indicated problems do not discredit the CVM however, they inspire one to think over the way of realizing it because they need to be solved already in the stage of planning the research.

The contribution of the authors in the article:

Anna Matel, M.Sc., Eng. – concept and objectives, literature review, research (50%)
Tomasz Poskrobko, Ph.D, Eng. – concept and objectives, literature review, research (50%)

46 K. Arrow, R. Solow, P.R. Portney, E.E. Leamer, R.Radner, H. Schuman, op. cit., p. 22.

47 M.D. Morrison, R.K. Blamey, J.W. Bennett, op. cit., p. 409.

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